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or alternatively

somatic symptoms in adolescents is important in designing or improving interventions for these patients.

**Methods:** Participants were 141 middle school adolescents, aged 11- to 15-years, with a mean age of 12.33-years ( $SD = 1.22$ ). Male participants made up 43.3% of the sample. Participants were asked to complete a questionnaire packet, with up to 20 students participating at one time. Portions of the questionnaire examined for this study included data from the Youth Self Report (Achenbach & Rescorla, 2001) and the Parental Authority Questionnaire (Buri, 1991), both of which have been shown to have adequate reliability and validity. Mediation analyses were performed (Baron & Kenny, 1986), followed by bootstrapping analytical methods to determine significance of the mediation effect.

**Results:** Authoritarian Parenting Style (AP) was a significant predictor of Somatic symptoms above and beyond Anxiety Problems,  $\beta = .15$ ,  $p = .04$ . The inclusion of Authoritarian parenting style into the model resulted in a combined 39% of variance in Somatic Problems, overall  $R = .63$ ,  $p < .001$ . When controlling for AP, the beta weight for Anxiety problems dropped from  $.62$ ,  $p < .001$  to  $.58$ ,  $p < .001$ . Permissive Parenting Style and Authoritative Parenting Style were not significantly associated with Somatic Problems.

**Conclusions:** Although AP, characterized by high levels of control and low levels of warmth, was not a full mediator in the current analyses, it was a significant predictor of somatic complaints for adolescents in this sample. This finding provides support for the addition of parenting-based interventions for children who have anxiety, and in particular, have somatic symptoms. Interventions that target both the individual adolescent and their families could have positive impacts on number of medical visits, school attendance, and distress experienced by these adolescents. Future research should explore such interventions.

**Sources of Support:** None.

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#### THE IMPACT OF BODY MASS INDEX ON THE ASSOCIATIONS BETWEEN PUBERTAL TIMING AND SELF-HARM, DEPRESSION, AND SELF-ESTEEM IN ADOLESCENT GIRLS

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**Purpose:** Among girls, early pubertal development has emerged as a risk factor for self-harm, depression, and low self-esteem. Compared to their on-time peers, girls who experience early puberty are also more likely to have elevated body mass index (BMI). Despite this, few studies that have examined the associations between pubertal timing and emotional health have accounted for BMI. The purpose of this study was to identify how, if at all, BMI impacts the relationship between pubertal timing and self-harm, depression, and self-esteem in a diverse group of female adolescents.

**Methods:** Data were drawn from EAT 2010 (Eating and Activity in Teens), a population-based survey of diverse adolescents (mean age: 14.7 years). A subset of female participants ( $n = 1165$ ) were categorized into four pubertal groups based on self-reported age of menarche: very early (11%, age = 10 yrs), early (25%, age = 11 yrs), on-time (52%, age = 12-13 yrs), and late (12%, age = 14 yrs). BMI was calculated from measured height and weight. The sample population demonstrated the expected inverse relationship between BMI and pubertal timing. Self-harm was assessed using a

dichotomized response (never vs. ever) to the following question: "Have you ever deliberately hurt yourself, such as cutting, scratching or burning, but not with the goal of ending your life?" Depressive mood was measured using the six-item Kandel and Davies Depressive Mood Scale (Cronbach's  $\alpha = 0.83$ ). Body satisfaction was measured using the sum score of response to participants' satisfaction with 13 body parts, rated on a 5-point Likert scale (Cronbach's  $\alpha = 0.94$ ). Regression analysis was performed adjusting for race, age at time of survey, and socioeconomic status (SES) to determine associations between pubertal timing and self-harm, depression, and self-esteem. These analyses then were repeated including BMI as a covariate.

**Results:** Initial analyses adjusting for race, age at time of survey, and SES, revealed that, compared to their on-time peers, girls who experienced very early puberty had higher odds of self-harm behavior ( $OR = 1.56$ , 95% CI: 1.01-2.42), significantly higher depressive symptom scores ( $\beta = 1.03$ ,  $SE = 0.50$ ), and significantly lower self esteem scores ( $\beta = -0.93$ ,  $SE = 0.36$ ). When analyses were repeated including BMI as an additional covariate, the odds of engaging in self-harm behavior and the difference in depression scores were no longer statistically significant. However, self-esteem scores remained significantly lower for girls who experienced very early puberty compared to their on-time peers ( $\beta = -0.83$ ,  $SE = 0.36$ ).

**Conclusions:** Initial, unadjusted outcomes supported previous research, but the associations between early pubertal timing and self-harm behavior and depression were no longer significant when adjusting for BMI. This indicates that BMI plays an important role in the relationship between pubertal timing and emotional health, and highlights the need to adjust for BMI in future studies. Clinically, providers can consider weight, pubertal timing, and mental health as inter-related and may use any of these topics as entry-points into discussion with patients and families about all of these issues.

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#### THE RELATIONSHIP BETWEEN PUBERTAL STATUS AND NEURAL ACTIVITY DURING RISKY DECISION-MAKING IN MALE ADOLESCENTS

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**Purpose:** Adolescence is a time of dramatic changes in a range of behaviours, which occur in tandem with changes in brain structure and function. These coincide with the physiological changes of puberty, but little research has focussed on the possible contributing role of puberty. One important behaviour emerging in adolescence is the increased propensity to make risky decisions. A prominent theory to explain this increased propensity for risk is the 'dual systems' model (Casey et al., 2008), where risky decisions result from a dissociation in the timing of the maturation of the limbic system and the prefrontal cortex, both regions involved in risky decision-making. The limbic system (incorporating the ventral striatum) is hypothesised to mature relatively early in adolescence, and is thought to be related to pubertal maturation. In contrast, the prefrontal cortex is thought to undergo more protracted development

throughout adolescence. This study explores how developmental changes in brain function when performing a risk-taking fMRI (functional Magnetic Resonance Imaging) task are related to puberty, independently of chronological age.

**Methods:** Forty-five male participants aged 13–14 years underwent fMRI scanning whilst performing a risk-taking task (BART task, adapted from Lejuez et al., 2002). In this age range, there is normal variability in pubertal development, with individuals being at all stages of puberty from pre-puberty to having completed puberty. In the BART task, participants had to decide whether to inflate a virtual balloon on a screen. Successful inflation of the balloon resulted in the opportunity to earn more money, but risked the balloon popping and the money being lost. Stopping allowed the participants to save the money towards their final earnings. Participants completed four six-minute runs of the task. Pubertal stage was assessed using self-report measures including a pictorial Tanner stage and the Pubertal Developmental Scale (Petersen et al., 1988). Salivary hormone levels were collected to measure levels of Testosterone, Oestradiol and DHEA. Participants also completed validated self-report questionnaires of risk-taking, impulsivity and sensation-seeking.

**Results:** The analysis focused on a main effect, across the entire group, of active decision-making compared to the control condition in regions including the prefrontal cortex and limbic system, which are known to be involved in risky decision-making. We also investigated whether this activation was differentially related to puberty across regions, using both group-wise and regression analyses.

**Conclusions:** This study investigated a role for puberty in the functional development of brain regions involved in risky decision-making in males, and further informs the usefulness of the dual systems model of risk taking during adolescence.

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## PREVENTION

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### VALIDATING A CHINESE VERSION OF THE GAPS QUESTIONNAIRE TO EXAMINE HEALTH RISK BEHAVIORS AND DEPRESSIVE SYMPTOMS AMONG UNDERGRADUATE STUDENTS IN HONG KONG

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**Purpose:** Unhealthy habits and risk behaviors like smoking, teenage pregnancy, drug and alcohol use in youth are associated with serious health problems such as psychological disorders, cardiac and respiratory diseases, cancer, complicated pregnancies and deliveries in later life. GAPS or the Guidelines for Adolescent Preventive Services, developed by the American Medical Association, is a validated and standardized screening tool for healthcare providers to assess adolescents for health risk behaviors. Research shows that anxiety and depression are common among teens in Hong Kong. In a recent study, university students in Hong Kong reported problems in the last five years with school issues (18.6%), depression (17.1%), body image (16.8%), and internet overuse (11.3%). However, their providers only infrequently asked or

provided counseling about these issues during clinical encounters. The purpose of this study was to validate a Chinese version of the Guidelines for Adolescent Preventive Services (GAPS) questionnaire, to use it to examine the general health risk behaviors among undergraduate students at a public university in Hong Kong, and to assess for depressive symptoms and associated factors.

**Methods:** A valid translation process including forward translation, back translation and pretesting was performed to obtain the final Chinese version of the GAPS questionnaire. A cross-sectional study was then conducted using a convenience sample (n = 400) of undergraduate students presenting to the university health service center. The anonymous self-administered Chinese version of the GAPS questionnaire was given to students waiting for medical care. Data analysis was performed using descriptive statistics, correlation test and stepwise logistic regression in SPSS.

**Results:** Of the 400 students who completed the questionnaires, 109 (27.3%) were males and 291 (72.8%) were females. Overall, participants reported a number of health risk behaviors including inadequate physical activity (73.2%), disordered eating (50.6%), and depressive symptoms (29.3%). In addition, respondents reported getting drunk in the past month (28.3%), engaging in sexually activity (13.3%), and having suicide attempts (7.3%). Using self-reported depressive symptoms as the outcome, multivariable regression results indicated that history of sexual or physical abuse (OR = 3.66), lack of parental support (OR = 2.86), ever been told that they have a learning problem (OR = 2.62), and body image disturbance (OR = 1.87) were strongly related to self-reported depressive symptoms among students.

**Conclusions:** The GAPS (Guidelines for Adolescent Preventive Services) is a useful tool for healthcare providers to assess adolescent health risk behaviors. The main self-reported risks in this study were inadequate physical activity, disordered eating and depression. Further interventions at the university setting could include using GAPS for routine student health visits and providing targeted counseling for issues such as depression. Since the questionnaire has been validated in Chinese and shown to be feasible in clinical settings, it could be used in the future to help health professionals to identify specific risk behaviors and improve the quality of care for adolescents in Hong Kong and China.

**Sources of Support:** None.

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### PRELIMINARY LONGITUDINAL FINDINGS FROM MULTICULTURAL INTEGRATED KIDNEY EDUCATION PROGRAM (MIKE PROGRAM): PREVENTING PRECURSORS TO KIDNEY DISEASE IN LOW-INCOME MINORITY ADOLESCENTS

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**Purpose:** Improving adolescent health is a public mandate that must be met by innovative and comprehensive new programs. Multicultural Integrated Kidney Education Program (MIKE Program) is a unique upstream project-based service learning program designed to prevent precursors to chronic kidney disease (CKD) such as obesity, high blood pressure, and poor nutrition (National Kidney Foundation, 2012) in low-income minority youth. Founded in Oregon in 2003, MIKE Program utilizes near peer mentors to empower youth to be health leaders—ambassadors for